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Datasheet for the decision of 15 January 2013

Case Number: T 1543/09 - 3.4.02

Application Number: 03721394.9

Publication Number: 1485697

IPC: G01N23/04

Language of the proceedings: EN

Title of invention:
COMPUTER TOMOGRAPH WITH A DETECTOR FOLLOWING THE MOVEMENT OF A PIVOTABLE X-RAY SOURCE

Applicant:
Medtronic Navigation, Inc.

Relevant legal provisions:
EPC Art. 54(1), 111(1)

Keyword:
Novelty (yes)
Remittal to the department of first instance

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Case Number: T 1543/09 - 3.4.02

D E C I S I O N
of the Technical Board of Appeal 3.4.02
of 15 January 2013

Appellant: (Applicant)	Medtronic Navigation, Inc. 710 Medtronic Parkway NE Minneapolis, MN 55432 (US)
Representative:	Greenwood, John David Graham Watt & Co LLP St Botolph's House 7-9 St Botolph's Road Sevenoaks Kent TN13 3AJ (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted 20 February 2009 refusing European patent application No. 03721394.9 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman: A. G. Klein
Members: F. J. Narganes-Quijano
D. Rogers

Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal against the decision of the examining division refusing European patent application No. 03721394.9 based on International application No. PCT/US03/08383 (published under the PCT with the International publication No. WO 03/081220).

II. During the examination proceedings the examining division referred to the following documents:

D1: "Description of a prototype combined CT-SPECT system with a single CdZnTe detector", K. Iwate *et al.*; Nuclear Science Symposium Conference Record, 2000 IEEE Lyon, France October 2000, Proceedings of IEEE (2000); pages 16-1 to 16-5

D2: "A combined SPECT and X-ray CT medical imaging system", K. Kalki *et al.*; Proceedings of SPIE Vol. 2432 (1995); pages 367 to 375

D3: JP-A-2000-201920

D3a: US-B1-6546068 (publication date 08.04.2003)

D5: "Einführung in die Computertomographie", T. M. Buzug; Springer-Verlag, Berlin (2004); pages 41 to 60

D8: "Dual-modality imaging: More than the sum of its components", B. H. Hasegawa *et al.*; Quantitative Analysis in Nuclear Medicine Imaging, Springer (2006); pages 35 to 74

In its decision the examining division held that the subject-matter of independent claims 1 and 25 of the request then on file was not new over any of documents D1 to D3.

III. With the statement setting out the grounds of appeal the appellant requested that the decision under appeal be set aside and that the Board find that the claim request underlying the decision under appeal and consisting of claim 1 filed under cover of a letter dated 5 November 2008 and claims 2 to 34 filed under cover of a letter dated 17 October 2005 is novel, and to remit the case to the department of first instance for further prosecution

IV. In a communication annexed to summons to oral proceedings the Board referred to document

D9: FR-A-2304321.

V. In reply to the summons to oral proceedings the appellant filed under cover of a letter dated 14 December 2012 sets of claims amended according to a first to a fifth auxiliary request.

VI. Oral proceedings before the Board were held on 15 January 2013.

The appellant maintained the request formulated in the statement of grounds of appeal as a main request and requested, alternatively, to grant a patent upon the basis of any of the auxiliary requests filed under cover of the letter dated 14 December 2012.

At the end of the oral proceedings the Board gave its decision as recorded in the Order below.

VII. Claim 1 of the main request corresponds with amended claim 1 filed under cover of the letter dated 5 November 2008, the wording of the claim incorporating as final phrase the text on page 17 of the amended set

of claims filed under cover of the letter dated 17 October 2005. A clean copy of the text of the claims of the main request was filed by fax on 19 December 2012 under cover of a letter dated 14 December 2012, the appellant having inadvertently failed to include this claim request with his original filing of 14 December 2012. The wording of this claim is as follows:

"An imaging apparatus, comprising:

a substantially O-shaped gantry ring having a central opening for positioning around an object to be imaged, the gantry ring having an interior cavity extending 360 degrees around the interior of the gantry ring;

a rigid, motorized rotor housed within, and rotatable 360 degrees around, the interior cavity of the gantry ring;

a source secured to the rotor, and adapted to project a beam of radiation in a first trajectory;

a detector secured to the rotor at a first position, and positioned to receive the beam of radiation in the first trajectory;

a detector positioner that translates the detector to a second position on the rotor, in a direction that is substantially normal to the first trajectory;

a beam positioner that alters the trajectory of the radiation beam to direct the beam onto the detector located at the second position;

the apparatus being arranged to rotate the rotor to select rotational positions around the interior of the gantry ring, and to synchronize the trajectory of the radiation beam with the translational position of the detector, so as to obtain effectively large field-of-view object images from a plurality of projection

angles over a partial or full 360 degree rotation of the rotor."

The wording of independent claim 25 of the main request reads as follows:

"A method of imaging an object, comprising:

positioning an object within a central opening of a substantially O-shaped gantry ring, the gantry ring having an interior cavity extending 360 degrees around the interior of the gantry ring;

rotating a rigid rotor within the interior cavity of the gantry ring to plural selected rotational positions over the full 360 degree circumference of the gantry, the rotor having a radiation source and a detector secured to the rotor;

projecting a beam of radiation from the source in a first trajectory, the beam traveling through a first region of the object and onto a detector located at a first position on the rotor;

translating the detector to a second position on the rotor in a direction that is substantially normal to the first trajectory;

altering the trajectory of the beam so that the team travels through a second region of the object and onto the detector located at the second position; and

detecting radiation at the detector at both the first detector position and the second detector position to obtain effectively large field-of-view object images from a plurality of different projection angles over a partial or full 360 degree rotation of the rotor."

The main request includes dependent claims 2 to 24 and 26 to 34 referring back to independent claims 1 and 25, respectively.

The wording of the claims amended according to the auxiliary requests is not pertinent for the present decision.

VIII. The arguments of the appellant in support of its requests can be summarized as follows:

Contrary to the examining division's interpretation of the claimed subject-matter, the claimed gantry ring does not merely constitute a covering housing or casing, but a supporting structure for the rotor. In addition, in its decision the examining division confuses the interior cavity and the central opening of the claimed O-shaped gantry ring.

None of the documents discloses a substantially O-shaped gantry ring having a central opening and a cavity extending 360 degrees around the interior of the ring either alone or in combination with a rigid motorized rotor as claimed, the radiation source and the detector being secured to the rotor and the rotor being housed within the interior cavity of the gantry ring. In particular, documents D1 and D2 disclose a gantry rotor that rotates the source and the detector. However, there is no actual gantry ring disclosed in document D2; Figure 1 of document D2 is purely schematic and the document only discloses a purely experimental system, i.e. a prototype that, as stated in document D8 with reference to Figure 3 (paragraphs bridging pages 38 and 40), is "impractical for commercial use", and the document does not even disclose a housing. As a matter of fact, the examining division itself admitted in its decision that such prototypes of scanners might be built comprising no housing. Document D1 does not disclose any more than

document D2. The approach followed in the decision is incorrect and inconsistent because it presupposes that the rotatable gantry disclosed in documents D1 and D2 constitutes the claimed rotor and some undisclosed housing constitutes the claimed gantry, whereas in Figure 2 of document D8 the rotor is a plate mounted on an external semicircular track devoid of an interior cavity.

Document D3 fails to disclose a number of claimed features. Post-published document D5 referred to by the examining division shows a rotor mounted on a structure (Figure 3.7(b)), but the structure has no cavity as claimed and the housing shown in the document is a mere enveloping casing and not a gantry or a supporting structure for the rotor.

In document D9 the rotor runs on a supporting ring (Figure 1b). However, while in this document only the circumferential edge of the rotor is inserted in the supporting ring, the claimed invention requires that the rotor is fully housed within the interior cavity of the gantry ring. In particular, in Figure 13 of the application the rotor is entirely covered by two parallel walls of the gantry ring.

In view of the examining division's finding of lack of novelty, the appellant did not have an opportunity to present arguments on inventive step during the first-instance oral proceedings. Remittal for further prosecution is therefore justified.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request - Novelty*

2.1 The set of claims of the main request corresponds to the set of claims underlying the decision under appeal. In its decision the examining division found that the subject-matter of independent claims 1 and 25 was anticipated by the disclosure of document D2 or, alternatively, by the disclosure of any of documents D1 and D3.

2.1.1 Claim 1 is directed to an imaging apparatus comprising a source of radiation and a radiation detector both secured to a rigid, rotatable rotor, the apparatus further comprising positioning means for positioning the radiation detector and the radiation beam emitted by the source with respect to each other as specified in the claim. It has been undisputed by the appellant that all these features are anticipated by the combined SPECT (single photon emission computed tomography) and X-ray CT imaging system disclosed in document D2, the system operating in the so-called third generation fan beam geometry by translating the detector across a fan to image the object (see abstract together with Figure 1 and the corresponding description on page 368, last paragraph).

According to claim 1 the imaging apparatus comprises in addition "a substantially O-shaped gantry ring having a central opening for positioning around the object to be imaged, the gantry ring having an interior cavity extending 360 degrees around the interior of the gantry ring" and the rotor is "housed within, and rotatable 360 degrees around, the interior cavity of the gantry ring". In the Board's view these features are to be construed in the technical context of the claimed

subject-matter as requiring that the O-shaped gantry ring constitutes a frame structure for - as stated by the examining division in its decision (page 5, fifth paragraph) - guiding and - as submitted by the appellant - supporting the rotatable rotor within the interior cavity of the gantry ring. This construction of the claimed invention is, in addition, supported by the description of the application, and in particular by the disclosure relating to Figures 12 and 13.

In its decision the examining division held that the rotor disclosed in document D2 and constituted by a rotating gantry (Figure 1 and page 368, last paragraph, line 8) requires an O-shaped fixed frame for guidance, and that the O-shaped fixed frame of a third generation scanner as that disclosed in the document always comprises a housing for the rotor. The examining division concluded that the system disclosed in document D2 implicitly discloses an O-shaped guidance frame and a housing and that these elements form an O-shaped gantry ring with an interior cavity housing the rotor as claimed.

The Board, however, cannot follow this line of argument. First, contrary to the examining division's view the rotor of the system of document D2 does not necessarily require a frame for guidance, let alone an O-shaped guiding frame, and there is no reason to conclude that such an O-shaped guiding frame is implicitly disclosed in the document. In particular, Figure 3 of post-published document D8 shows a picture of a prototype of the system disclosed in, and used by the authors of document D2 (*cf.* reference [60] in document D8 and the paragraphs bridging pages 38 and 40 of the document). No O-shaped guiding frame is derivable from the picture. In addition, Figures 3.7

and 3.10 of the historical review presented in post-published document D5 show pictures of CT imaging systems comprising optical parts secured to a rotor and a casing or covering housing. No O-shaped guiding frame having an interior cavity housing the rotor is discernible in these pictures.

Second, there is no implicit or explicit disclosure of a housing in document D2 and no evidence that a third generation scanner as that disclosed in document D2 necessarily incorporates a housing. As a matter of fact, document D2 only discloses schematically an experimental system, apparently based on a prototype (see references to document D8 in the former paragraph). The examining division itself has acknowledged in its decision that such prototypes can be built comprising no housing. In this context, the examining division was of the view that under normal circumstances CT imaging systems of the third generation under consideration always comprise a ring-shaped housing as shown in post-published document D8 (Figure 4) and in the historical review in post-published document D5 (Figures 3.7, 3.10, 3.13 and 3.19). The examining division's position on this issue, however, pertains, by its very nature, to the evaluation of inventive step in the light of the common general knowledge. The examining division's position that third generation systems always comprise a ring-shaped housing does not provide a sufficient basis from which to conclude that the provision of such a housing is implicitly disclosed in - or unambiguously derivable from - document D2. In any case, the examining division's reasoning presupposes that a housing covering the system of document D2 would constitute part of the guiding frame referred to by the examining division, but a casing or covering housing - in

particular of the type shown in documents D5 and D8 - does not constitute *per se* a guiding frame nor can be considered as constituting part of a guiding frame. In addition, the provision of a covering housing or casing might well form a cavity in its interior, but in the system of document D2 this cavity would then be formed between the covering housing or casing and the remaining parts of the system and would not properly constitute an interior cavity of an O-shaped guiding frame, such cavity housing the rotor, as assumed by the examining division in its line of argument.

The Board concludes that document D2 does not disclose an O-shaped gantry ring having an interior cavity extending 360 degrees around its circumference, let alone rotatably housing within this interior cavity, the rotor having secured thereto the radiation source and the radiation detector as required in claim 1.

2.1.2 Document D1 (see abstract and Figure 1 together with the corresponding description) and document D3 (see figures and the English abstract; see also the post-published patent document D3a of the same patent family) disclose imaging systems of the type disclosed in document D2. In these systems the radiation source and the detector appear to be secured to a rotatable structure (D1, rotatable gantry shown in Figure 1, and D3, figures). However, for reasons analogous to those set forth in point 2.1.1 with regard to document D2, documents D1 and D3 do not disclose the provision of an O-shaped gantry ring having an interior cavity housing the rotatable structure as claimed.

2.1.3 Document D9 cited in the International search report discloses a tomographic imaging system having a plurality of detectors secured to an O-shaped rotor,

the outer peripheral section of the rotor being engaged in a recess of a stationary, O-shaped supporting frame structure (Figures 1a and 1b and the corresponding description). However, the O-shaped supporting frame does not comprise an interior cavity housing the rotor as claimed and, in addition, the optical imaging system is based on an optical arrangement (see Figures 1a and 3 and the description of the same) differing in several respects from the claimed arrangement.

2.1.4 The remaining documents on file are less pertinent.

Therefore, the subject-matter of claim 1 is novel over the prior art documents on file.

2.2 Independent claim 25 is directed to a method of imaging an object and most of the steps of the method are in one-to-one relationship with the functional features of the different structural means defined in claim 1. In particular, the method involves, among other steps, the use of an O-shaped gantry ring and of a rotor having the structural and functional features of the corresponding elements defined in claim 1. Accordingly, the same conclusion reached in point 2.1 above with respect to the novelty of claim 1 also applies to independent claim 25.

The remaining claims 2 to 24 and 26 to 34 of the main request are dependent claims referring back to independent claims 1 and 25, respectively, and consequently the subject-matter of these claims is also novel.

2.3 The Board concludes that the subject-matter of the claims of the main request is novel over the prior art on file.

3. *Further prosecution*

In the section of its decision relating to novelty the examining division expressed by way of an *obiter dictum* its opinion that the incorporation of a housing in the imaging system disclosed in document D2 would in any case be obvious. As noted in the penultimate paragraph of point 2.1.1 above, however, the mere provision of a housing would not result in an O-shaped gantry ring having an interior cavity housing the rotor as claimed. In addition, as far as the subject-matter of the main request under consideration is concerned, the examination proceedings focused on the issue of novelty. The appellant has not yet had an opportunity to present its case on inventive step, on the basis of the claimed invention as construed in point 2 above, before the examining division.

In these circumstances the Board considers it appropriate to exercise its discretion under Article 111(1) EPC and - in agreement with the main request formulated by the appellant - to remit the case for further prosecution, and in particular to examine - possibly after performing a supplementary search if the examining division deems it expedient - whether the subject-matter of the claims of the main request involves an inventive step.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance for further prosecution upon the basis of the claims of the main request.

The Registrar: The Chairman:

M. Kiehl A. G. Klein

Decision electronically authenticated